

Claims

[c1] What is claimed is:

1. An in-plane switching mode liquid crystal display (IPS-LCD) comprising:
 - a lower substrate;
 - a plurality of parallel scan lines and a plurality of data lines with equal distances positioned on the lower substrate, wherein the scan lines and the data lines are arranged in a crossing manner to form a pixel matrix, any two of the adjoining scan lines and any two of the adjoining data lines being crossed to define a pixel;
 - a plurality of first electrodes formed in each of the pixels, wherein each of the first electrodes contains a plurality of first electrode offshoots, the first electrode offshoots being arranged parallel with each other;
 - an insulation layer covering the scan lines and the first electrodes;
 - a plurality of second electrodes formed in each of the pixels, wherein each of the second electrodes covers at least one of the first electrode offshoots in each of the pixels;
 - an upper substrate formed in parallel with and opposite to the lower substrate; and

a plurality of liquid crystal molecules filled between the upper substrate and the lower substrate;
wherein an overlapping portion of each of the first electrode offshoots and each of the second electrode serves as a storage capacitor of each of the pixels.

[c2] 2.The IPS-LCD of claim 1, wherein the first electrode offshoots are parallel with the data lines in each of the pixels.

[c3] 3.The IPS-LCD of claim 1, wherein the second electrodes partially cover the scan lines, an overlapping portion of each of the second electrodes and each of the scan lines serving as the storage capacitor of each of the pixels.

[c4] 4.The IPS-LCD of claim 1, wherein each of the second electrodes contains a plurality of second electrode offshoots, each of the second electrode offshoots being arranged parallel with the first electrode offshoots and covering one of the first electrode offshoots in each of the pixels.

[c5] 5.The IPS-LCD of claim 1 further comprising a first polarizer and a second polarizer positioned on an upper surface of the upper substrate and a bottom surface of the lower substrate respectively.

[c6] 6.The IPS-LCD of claim 1 further comprising a first

alignment film and a second alignment film on a bottom surface of the upper substrate and an upper surface of the lower substrate respectively.

- [c7] 7.The IPS-LCD of claim 1, wherein each of the pixels further comprises a thin film transistor (TFT), the TFT serving as a switching device of the pixel.
- [c8] 8.The IPS-LCD of claim 1, wherein each of the first electrodes is used as a common electrode in each of the pixels.
- [c9] 9.The IPS-LCD of claim 1, wherein each of the second electrodes is used as a pixel electrode in each of the pixels.
- [c10] 10.The IPS-LCD of claim 1, wherein each of the first electrodes and each of the second electrodes are disposed in a single-layer structure or a multi-layer structure.
- [c11] 11.The IPS-LCD of claim 1, wherein the first electrodes and the second electrodes comprise titanium(Ti), aluminum(Al), aluminum based alloy,indium tin oxide (ITO), or other conductive materials.
- [c12] 12.The IPS-LCD of claim 1, wherein the data lines, the first electrode offshoots, and the second electrodes are

bended lines.

- [c13] 13. An IPS-LCD comprising:
- a lower substrate;
 - a plurality of parallel scan lines and a plurality of data lines with equal distances positioned on the upper surface of the lower substrate, wherein the scan lines and the data lines are arranged in a crossing manner to form a pixel matrix, any two of the adjoining scan lines and any two of the adjoining data lines being crossed to define a pixel;
 - a plurality of the first electrodes formed in each of the pixels, wherein each of the first electrodes contains a plurality of first electrode offshoots, the first electrode offshoots being arranged parallel with each other in the pixels;
 - a plurality of capacitor electrodes arranged parallel with the first electrode offshoots in the pixels, each of the pixels comprising at least one of the capacitor electrodes;
 - an insulation layer covering the first electrodes, the capacitor electrodes, and the scan lines ;
 - a plurality of second electrodes, each of the second electrodes covering at least one of the capacitor electrodes formed in each of the pixels;
 - an upper substrate positioned on the lower substrate in

parallel with and opposite to the lower substrate; and
a plurality of liquid crystal molecules filled between the
lower substrate and the upper substrate;
wherein an overlapping portion of each of the second
electrodes and each of the capacitor electrodes serves as
a storage capacitor of each of the pixels.

[c14] 14.The IPS-LCD of claim 13, wherein the first electrode
offshoots are parallel with the data lines in the pixels.

[c15] 15.The IPS-LCD of claim 13, wherein the second elec-
trodes partially cover the scan lines, an overlapping por-
tion of each of the second electrodes and the scan lines
serving as the storage capacitor of each of the pixels.

[c16] 16.The IPS-LCD of claim 13, wherein each of the second
electrodes comprises a plurality of second electrode off-
shoots, each of the second electrode offshoots being ar-
ranged parallel with the first electrode offshoots and
covering one of the capacitor electrodes formed in each
of the pixels.

[c17] 17.The IPS-LCD of claim 13 further comprising a first
polarizer and a second polarizer positioned on an upper
surface of the upper substrate and a bottom surface of
the lower substrate respectively.

[c18] 18.The IPS-LCD of claim 13 further comprising a first

alignment film and a second alignment film on a bottom surface of the upper substrate and an upper surface of the lower substrate respectively.

- [c19] 19.The IPS-LCD of claim 13, wherein each of the pixels further comprises a TFT, the TFT serving as a switching device of the pixel.
- [c20] 20.The IPS-LCD of claim 13, wherein each of the first electrodes is used as a common electrode of each of the pixels.
- [c21] 21.The IPS-LCD of claim 13, wherein each of the second electrodes is used as a pixel electrode of each of the pixels.
- [c22] 22.The IPS-LCD of claim 13, wherein each of the first electrodes, each of the second electrodes, and each of the capacitor electrodes are disposed in a single-layer structure or a multi-layer structure.
- [c23] 23.The IPS-LCD of claim 13, wherein each of the first electrodes, each of the second electrodes, and each of the capacitor electrodes comprise titanium, aluminum, aluminum based alloy, ITO, or other conductive materials.
- [c24] 24.The IPS-LCD of claim 13, wherein the data lines, the

first electrode offshoots, the second electrodes, and the capacitor electrodes are bended lines.